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(71) 出願人 (米国を除くすべての指定国について)
科学技術振興事業団
(JAPAN SCIENCE AND TECHNOLOGY CORPORATION)
[JP/JP]
〒332-0012 埼玉県川口市本町4丁目1番8号 Saitama, (JP)
(72) 発明者 ; および
(75) 発明者／出願人 (米国についてのみ)
岡芳樹(ICHIOKA, Yoshiki)[JP/JP]
〒658-0064 兵庫県神戸市東灘区鴨子ヶ原1丁目4-15-131
Hyogo, (JP)
小西　毅(KONISHI, Tsuyoshi)[JP/JP]
〒569-1022 大阪府高槻市日吉台四番町20-41 Osaka, (JP)
(74) 代理人
弁理士　西澤利夫(NISHIZAWA, Toshio)
〒150-0042 東京都渋谷区宇田川町37-10 麻仁ビル6階
Tokyo, (JP)

(54)Title: <u>METHOD FOR EXTRA-HIGH SPEED TRANSFORMATION OF TIME SIGNAL INTO TWO-DIMENSIONAL SPACE SIGNAL</u>

(54)発明の名称　　時間信号の2次元空間信号への超高速変換方法
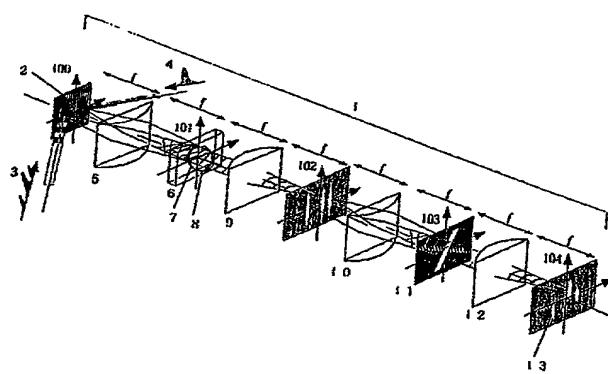
(57) Abstract

A signal light pulse to be transformed into a two-dimensional space signal and a reference extra-short light pulse are directed to a dispersion device (2). One-dimensional frequency light distributions produced by a one-dimensional Fourier transformation lens (5) are made to enter a nonlinear crystal (6) to form a 2nd-harmonic. The light wave distribution produced by subjecting the 2nd-harmonic to time-space transformation through the one-dimensional Fourier transformation lens (9) is filtered by a time-frequency filter (11) provided on the filter surface (102) of a one-dimensional space frequency filtering optical system and transformed into a two-dimensional space signal (13) corresponding to the two-dimensional light distribution which is time-frequency-developed and which represents the relation between the time and frequency of the signal light pulse. Thus, a specific technique of realizing extra-high speed transformation of a signal form from a time signal into a two-dimensional space signal without necessity of active scanning and displaying the 2-dimensional signal in a visible region in a temporally steady state is provided.

ABSTRACT

A signal light pulse to be converted into a two-dimensional space signal and a reference ultra-short light pulse are directed to a dispersion device 2, a second-harmonic is generated by introducing an one-dimensional frequency light distribution obtained by an one-dimensional Fourier transform lens 5, the second-harmonic is then subjected to time-to-space conversion through an one-dimensional Fourier transform lens so as to obtain a light wave distribution, and the light wave distribution is then subjected to filtering by a time-frequency filter 11 provided on a filter plane 102 of an one-dimensional space frequency filtering optical system and is further converted into a two-dimensional space signal 13 corresponding to a time-frequency expanded two-dimensional light distribution which represents a relation between time and frequency of the signal pulse light. Thereby, there is provided a specific technique of realizing ultra-fast conversion of signal form from time signal into two-dimensional space signal without any active-scan and also displaying the two-dimensional signal in a visible region with a temporally steady state.